

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

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UNITED STATES PATENT AND TRADEMARK OFFICE

**PAT. & T.M. OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES**

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte YASUYUKI TANAKA, NAOYA ICHIKAWA, TOSHIAKI SAKAKI,
YUICHI HIOKI and MASAHIRO HAYASHI

Appeal No. 2001-0676
Application No. 08/941,132

HEARD: April 25, 2002

Before KIMLIN, PAK, and POTEATE, Administrative Patent Judges.
PAK, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 9 through 19. Claims 1 through 3, 7 and 8, the remaining claims in the above-identified application, stand withdrawn from consideration by the examiner as being drawn to a non-elected invention.

At page 4 of the Brief, appellants have grouped the claims on appeal as follows:

Group I - Claims 9, 11 and 13 through 16; and
Group II - Claims 10, 12 and 17 through 19.

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Therefore, for purposes of this appeal, the claims in each group stand or fall together with the broadest representative claim therein, namely claims 9 and 10, consistent with 37 CFR § 1.192(c)(7) (2000). Claims 9 and 10 are reproduced below:

9. A process for the production of a graft-copolymerized natural rubber which comprises deproteinizing natural rubber and then graft-copolymerizing the natural rubber.

10. A process for the production of an epoxidized natural rubber which comprises deproteinizing natural rubber and then epoxidizing the natural rubber.

The prior art references relied upon by the examiner are:

Kondo et al. (Kondo)	4,208,490	Jun. 17, 1980
Hayashi et al. (Hayashi)	4,528,340	Jul. 9, 1985
Burlett et al. (Burlett)	5,118,546	Jun. 2, 1992
Yasuyuki et al. (Yasuyuki)	0 584 597 A1 (Published European Patent Application)	Mar. 2, 1994

Claims 9 through 19 stand rejected under 35 U.S.C. § 103 as unpatentable over the combined disclosures of Yasuyuki and either Kondo, Burlett or Hayashi.

In reaching our decisions on the issues raised in this appeal, we have carefully reviewed the claims, specification and applied prior art, including all the arguments and evidence advanced by the examiner and the appellants in support of their respective positions. As a consequence of our review, we have made the determinations which follow.

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The claimed subject matter is directed to two different embodiments. See, e.g., claims 9 and 10. The first embodiment defined by claim 9 is directed to a process for producing a graft copolymerized natural rubber, wherein natural rubber is initially deproteinized and then is graft-copolymerized. The second embodiment defined by claim 10 is directed to a process for producing an epoxidized natural rubber, wherein natural rubber is initially deproteinized and then is epoxidized.

Under Section 103, the obviousness of an invention cannot be established by combining the teachings of the cited prior art absent some teaching, suggestion or incentive supporting the combination. See *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). This does not mean that the cited prior art references must specifically suggest making the combination. See *B.F. Goodrich Co. v. Aircraft Braking Systems Corp.*, 72 F.3d 1577, 1582, 37 USPQ2d 1314, 1318 (Fed. Cir. 1996); *In re Nilssen*, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988). Rather, the test for obviousness is what the combined teachings of the references would have suggested to those of ordinary skill in the art. *In re Young*, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991); *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981).

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In evaluating the prior art references, it is proper to take into account not only the specific teachings of the references but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968). All of the disclosures in the prior art reference must be evaluated for what they fairly teach or would have suggested to one having ordinary skill in the art. *In re Boe*, 355 F.2d 961, 965, 148 USPQ 507, 510 (CCPA 1966).

With the above binding precedents in mind, we turn to the examiner's rejection of claims 9 through 19 under 35 U.S.C. § 103 as unpatentable over the combined disclosures of Yasuyuki and either Kondo, Burlett or Hayashi.

The examiner finds (Answer, page 3), and the appellants do not dispute (Brief, pages 7-19), that:

Yasuyuki teaches deproteinizing natural rubber (measured as weight percent nitrogen) to nitrogen levels below 0.02% by weight to remove allergens and enhance physical properties [page 2, line 11 - page 3, line 11; page 10, Table 1, Example 1; claim 2,]. "By almost completely eliminating non-rubber components, an advantageous material for producing rubber products which suffer from little energy loss and have excellent mechanical properties, improved crepe characteristics and improved aging resistance, can be provided." [page 3, lines 3-6]. The deproteinized rubber also possesses excellent processing and mechanical characteristics [page 24, lines 1-27].

We find that Yasuyuki also teaches (page 2, lines 10-18) that

Natural rubber has been widely employed in industrial articles such as automobile tires, belts and adhesives and domestic articles such as gloves.

In addition to its excellent mechanical properties as vulcanized rubber, natural rubber is much superior in the raw rubber strength (green strength) to synthetic rubber. Accordingly, natural rubber is excellent in processing characteristics in kneading, sheeting and various molding procedures. In the form of a latex, natural rubber has a high gel strength at solidification and thus can be easily formulated into a film, which makes the natural rubber applicable to various products including condoms, surgical gloves and diverse catheters.

We find that Yasuyuki further teaches (page 5, lines 10-19 and 27-31) that:

No such a natural rubber as the one according to the present invention, from which proteins have been almost completely eliminated, has been obtained hitherto. This deproteinized natural rubber, which is substantially free from any protein, is not only useful as a countermeasure to the allergic reactions but also expected to be usable as a material for providing highly refined products of good qualities having characteristics different from common natural rubber (for example, low water absorptivity, electrical properties, low hysteresis loss, colorless and transparent appearance) and suffering from no lot-to-lot variation characteristic to natural materials.

In addition, natural rubber tends to be hardened during storage period (i.e., storage hardening), which makes mastication for plasticizing necessary prior to the use. It has been found out, however, that a natural rubber from which proteins have been completely eliminated would never undergo this phenomenon.

...
An additional disadvantage of natural rubber resides in that it is colored and the coloration becomes more conspicuous with the lapse of time, since it contains carotenoid which is a polyene having an isoprene structural unit and a number of conjugated double bonds. However, these carotenoid impurities are eliminated during the process for reducing proteins. Consequently, a natural rubber comparable to synthetic ones in the transparent and colorless appearance can be obtained.

Recognizing that Yasuyuki is silent as to graft-copolymerizing or epoxidizing the deproteinized natural rubber, the examiner relies on either Kondo, Burlett or Hayashi.

Kondo teaches graft-polymerizing a rubbery polymer, such as synthetic rubber or natural rubber, which may be employed in the form of a latex, to improve its physical properties, such as high impact resistance and "beautiful appearance". See column 2, line 61 to column 3, line 49 and column 4, lines 24-28. The appellants also acknowledge that graft copolymerizing natural rubber to improve its mechanical properties is known. See the specification, page 2.

Given the improvement in physical properties imparted by deproteinizing natural rubber (which is superior to synthetic rubber in green strength) and graft-polymerizing protein free (synthetic rubber) and protein present (natural rubber) rubbers, we concur with the examiner that the combined teachings of Yasuyuki

and Kondo would have led one of ordinary skill in the art to deproteinize and graft-copolymerize natural rubber, motivated by a reasonable expectation of obtaining a rubber material having significantly improved physical properties. The appellants, however, are correct in asserting that the combined teachings of Yasuyuki and Kondo do not teach or suggest epoxidizing the deproteinized natural rubber.

The examiner relies on either Burlett or Hayashi to show that epoxidizing synthetic and/or natural rubber to enhance their physical properties is well known. See Answer, page 4. The appellants also acknowledge that epoxidizing natural rubber to impart excellent physical properties is known. See the specification, page 2.

Given the improvement in physical properties imparted by deproteinizing natural rubber (which is superior to synthetic rubber in green strength) and epoxidizing protein free (synthetic rubber) and protein present (natural rubber) rubbers, we concur with the examiner that the combined teachings of Yasuyuki and either Burlett or Hayashi would have led one of ordinary skill in the art to deproteinize and epoxidize natural rubber, motivated by a reasonable expectation of successfully obtaining a rubber material having significantly improved physical properties. The

appellants, however, are correct in asserting that the combined teachings of Yasuyuki and either Burlett or Hayashi do not teach or suggest graft-copolymerizing the deproteinized natural rubber.

Thus, we determine that the combined teachings of Yasuyuki and Kondo would have rendered only the subject matter defined by claims 9, 11 and 13 through 16 *prima facie* obvious to one of ordinary skill in the art. Similarly, we determine that the combined teachings of Yasuyuki and either Burlett or Hayashi would have rendered only the subject matter defined by claims 10, 12 and 17 through 19 *prima facie* obvious to one of ordinary skill in the art.

As a rebuttal to the *prima facie* case, the appellants rely on a declaration filed under 37 CFR § 1.132 by Mr. Yoshiaki Miyamoto (hereinafter referred to as "Miyamoto declaration") and Tables 1-3 in the specification. See the Brief, pages 9-19 and the Miyamoto declaration, pages 2 and 3. The Miyamoto declaration specifically states that:

Through logic, the skilled artisan would reasonably conclude that there would be little to no difference in the efficiency of the grafting and epoxidation processes when using natural rubber versus deproteinized rubber, since the naturally occurring proteins are not extracted from the rubber, *per se*, and are simply broken down to smaller units called polypeptides.

Yasuyuki et al teaches that the deproteinized rubber still contains the polypeptides formed during the deproteinization step (see line 34 of page 4 to line 9 of

page 5). Therefore, the skilled artisan would reasonably conclude that there would be little or no improvement in the efficiency of the graft-copolymerization and/or epoxidation reactions using the deproteinized rubbers, since the polypeptides from the naturally occurring proteins are still present and would impede the graft-copolymerization and/or epoxidation reactions in the same manner as would the naturally occurring proteins.

According to the appellants and declarant (the Brief, pages 9-19 and the Miyamoto declaration, page 3), the improved efficiency in graft-copolymerization and epoxidation resulting from the deproteinization suggested by the applied prior art contrary to the skilled artisan's expectation establishes that the claimed subject matter as a whole imparts unexpected results.

It is not enough for the appellants to evince that the appellants' invention produces an improvement. The improvement must be shown to be unexpected. *In re Freeman*, 474 F.2d 1318, 1324, 177 USPQ 139, 143 (CCPA 1973) *In re Klosak*, 455 F.2d 1077, 1080, 173 USPQ 14, 16 (CCPA 1972). Here, Yasuyuki teaches removing non-rubber components from natural rubber via a combination of known protein removing and reducing techniques. See page 2, lines 1-21. According to Yasuyuki (page 3, lines 46-48), proteins are eliminated from natural rubber to "such a level that it does not give an absorption at 3280 cm⁻¹ in the infrared absorption spectrum, which is characteristic to **polypeptides**, when measured in

the form of a raw rubber film (emphasis ours).” Thus, using the same logic in the Miyamoto declaration, we can conclude that one of ordinary skill in the art would reasonably expect the improved efficiency in graft-copolymerization and epoxidation resulting from the deproteinization suggested by the applied prior art since reaction interfering non-rubber components, such polypeptides, are no longer present during graft-copolymerization or epoxidation. See, e.g., *In re Skoner*, 517 F.2d 947, 950, 186 USPQ 80, 82 (CCPA 1975) (“[e]xpected beneficial results are evidence of obviousness of a claimed invention just as unexpected beneficial results are evidence of unobviousness”).

To the extent that the additional advantage indicated *supra* is deemed unexpected, we still do not believe that it is sufficient to rebut the *prima facie* case established by the examiner. We determine that the recognition of the additional advantage flowing naturally from following the suggestion of the applied prior art cannot be the basis for patentability when the difference would be otherwise obvious. *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Int. 1985). In other words, we find that the known advantages of deproteinizing and graft-copolymerizing or epoxidizing natural rubber indicated above, on balance, outweigh the newly discovered additional advantage of doing the same. *In re May*, 574 F.3d 1082,

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1092, 197 USPQ 601, 609 (CCPA 1978); *In re Nolan*, 553 F.2d 1261, 1267, 193 USPQ 641, 645 (CCPA 1977).

Under the circumstances recounted above, we concur with the examiner that the evidence of obviousness drawn to the *prima facie* case indicated above, on balance, outweighs the evidence of nonobviousness proffered by the appellants. Thus, we

- 1) affirm the examiner's Section 103 rejection of claims 9, 11 and 13 through 16 as unpatentable over the combined disclosures of Yasuyuki and Kondo;
- 2) reverse the examiner's Section 103 rejection of claims 10, 12, and 17 through 19 as unpatentable over the combined disclosures of Yasuyuki and Kondo;
- 3) affirm the examiner's Section 103 rejection of claims 10, 12 and 17 through 19 as unpatentable over the combined disclosures of Yasuyuki and either Burlett or Hayashi; and
- 4) reverse the examiner's Section 103 rejection of claims 9, 11 and 13 through 16 as unpatentable over the combined disclosures of Yasuyuki and either Burlett or Hayashi.

Accordingly, the decision of the examiner is affirmed.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

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